

Patent claims

1. Lens device for the treatment of visual impairments comprising a fixation element for fixing in the eye, wherein this device features at least one convex lens element and several wedge-shaped recesses (32).
2. Lens device according to claim 1, wherein the convex lens elements are designed as a segment of a Fresnel lens (48).
3. Lens device according to claim 1 to 2, wherein the wedge-shaped recesses (32) feature different angles (36, 37).
4. Lens device according to claim 1 to 3, wherein the rear side features a coating or protective layer (34) to fill the recesses preventing the reflection of light on the edges of the lens device after passage through the lens device.
5. Lens device according to claim 1 to 4, wherein the coating (34) and/or the material for the device feature a refraction index equal to the chamber fluid.
6. Lens device according to claim 1 to 5, wherein the lens device features an anterior and posterior chamber (54, 55) which are separated by a likewise transparent wall, whereby the anterior chamber which is not facing the retina features at least one convex elastic element, so that by alignment of the curve of this element the focal width of this element is produced to be variable.
7. Lens device according to claim 6, wherein the lens device in the posterior chamber which faces the retina features a transparent, elastic coating (53), and the posterior

chamber features a supporting element (67) for the recesses (32), which is designed to be mounted rotatably against the rest of the posterior chamber, so that the inclination is adjustable to the recesses (32) of the suitable surface.

8. Lens device according to claim 7, wherein the supporting element is attached to an elastic element which is pre-stressed against rotation (50).
9. Lens device according to claim 6 to 8, wherein each chamber (54, 55) is connected to a supply and removal canal which, respectively, is assigned at least one pump or volume modification means (51, 52) either directly or indirectly via one or more valves, so that either the elastic, convex element of the anterior chamber (54) and/or the elastic coating (53) undergoes a change of form when the pump or volume modification means is activated, and the supporting element (67) for the recesses (32) undergoes rotation due to the coating (53) changing its form.
10. Lens device according to claim 6 and 9, wherein, in the posterior chamber which faces the retina, a mobile, transparent and inclined surface, respectively, is assigned to the wedge-shaped recesses which are designed to be mounted rotatably due to rotation elements (49), whereby an elastic element (50) is assigned to each of these rotatable, inclined surfaces and, taking claim 9 into consideration, the inclined surfaces undergo a rotation when the pump or volume modification means (51, 52) assigned to the anterior chamber is activated, so that the focal point is designed to be redirected on the retina.

11. Lens device according to claim 1 and 10, wherein each chamber (54, 55) is designed to be filled with a transparent, preferably fluid, medium, whose refraction index is designed to be adjusted to that of the chamber fluid and/or the transparent, elastic coating (53) and/or the wall (56).
12. Lens device according to claim 9, wherein implanted batteries or receivers are provided as means of providing energy for the volume modification means or means of pumping, and/or converters for the energy input from outside of the body of the patient, e.g. by electromagnetic and/or magnetic fields.
13. Lens device according to claim 1 to 12, wherein at sites without wedge-shaped recesses or convex lens parts or segments of a Fresnel lens, but also in combination with these, further optic means, such as e.g. lenses for the correction of the near field, are provided, whereby these - due to the reduction of the thickness of the lens device obtained according to the present invention - can also be provided in the path of rays before or behind the lens device according to the present invention.
14. Lens device according to claim 1 to 13, wherein the lens device features at least one UV-protective film (38) for the protection of the retina from UV rays.
15. Lens device according to claim 1 to 14, wherein the lens device is designed to be foldable or elastic for the reduction of the sclera tunnel incision.
16. Lens device according to claim 1 to 15, wherein the lens device features on one side several wedge-shaped recesses and on the other side a superposition of spherical and

non-spherical segments of one or several Fresnel lenses (48).

17. Lens device according to claim 1 to 16, wherein the lens device features on one side planar and on the other side a superposition of wedge-shaped recesses (32) and spherical and non-spherical segments of one or several Fresnel lenses (48).
18. Lens device according to claim 9 to 16, as far as can be referred back to claim 9, whereby the pump or volume modification means feature a characteristic curve, which allows conclusions to be drawn on the counterpressure on the recorded performance of the pump or volume changes, against which the pump or volume modification means work, so that a determination of the pressure in the interior of the eye is possible via the measurement of the recorded performance.